An Economic Evaluation of the Possible Modification to the Definition of Supported Universal Services

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1. Introduction

The Federal Communications Commission is reconsidering its definition of universal service – *i.e.*, the mandatory list of basic local telecommunications services that must be offered by any carrier participating in the federal high-cost universal service program. Universal service is currently defined by a set of component services: voice grade access to the public switched network, with the ability to place and receive local and interexchange calls; dual tone multi-frequency (DTMF) signaling or its functional equivalent; single-party service; access to emergency services; access to operator services; access to directory assistance; and toll limitation services for qualifying low-income consumers.[2]

The operational structure of universal service is shared by many entitlement programs that redistribute resources in ways that are intended to further the public interest. This program is the manifestation of public policy supported by the public demand for affordable basic local telecommunications service most recently expressed at the federal level by their representatives' enactment of the Telecommunications Act of 1996.[3] One of the key aspects of the universal service program is designed to support the provision of basic local telecommunications service in high-cost, rural, and insular areas. However, universal service also creates a potential danger that these programs impose exchanges on consumers that reduce the aggregate welfare. If a program or a component of a program reduces aggregate welfare, we can conclude the program is inefficient and misguided.

Technically, there are at least three general sources of potential inefficiency in a universal service program. First, there may be inefficiency in production (i.e., programs that distort providers' production process or choice of technology). Second, there may be inefficiency in funding (i.e., economic distortions due to variations in the level of taxes used to derive funds for the program). And third, there may be inefficiency in consumption (inefficient choices by consumers based on characteristics of the universal service program).[4] While each of these sources of inefficiency is important to the

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[1] The authors' professional experience and qualifications are summarized in an attachment to this paper.

[2] 47 CFR 54.101(a); *Federal-State Joint Board on Universal Service,* First Report and Order, 12 FCC Rcd 8776, 8801, para. 22 (1997), *subsequent history omitted*.

[3] 47 USC 254

[4] Technically, an economist might describe both categories two and three as inefficiency in exchange (a distortion in the quantity of specific services or service components produced and consumed).

construction of a sound universal service program, we will concentrate primarily on the third one (inefficiency in consumption) which is largely relevant to changes in the definition of supported services. At the end of this paper, we briefly treat one aspect of inefficiency in production. For the rest of our discussion, we will use the term "inefficiency" to simply mean inefficiency in consumption, unless we state otherwise.

A program is inefficient when consumers are willing to trade or substitute away from the allocation imposed by the program, and are able to do so without conflict with the public interest. Consider a non-telecommunications example, food stamps. Some participants substitute away from the components of the program by selling food stamps at a discount to others (i.e., they find another component bundle, cash for a discounted value of the food stamps, of higher value). In addition, many qualified potential participants may choose not to participate in the food stamps program because using stamps may appear degrading and limits choices as a consumer (e.g., inability to purchase non-food items). In both instances, the result is that the program is less effective because some of the residents that the food stamp program was designed to help don't participate as planned; that is they substitute away from the program components (or the program in its entirety). This is an indication of inefficiency in consumption.

Notably, with the food stamp program, the public policy choice that "supported services" do not include alcohol, tobacco, and other types of "foods" or non-foods is obvious and clearly established. In contrast, with respect to supported telecommunications services, the choice is far less obvious. Apart from basic ground rules to structure the program, there is little or no need for paternalistic notions to constrain consumers' range of choices of the bundle of supported telecommunications components and services.

2. The efficiency of universal service and basic local service components

An indication of the past efficiency of universal service in serving the public interest is the longevity of its political support. However, policy may need to change when dramatic changes in regulation, technology and consumer preferences present a new array of problems. Congress recognized this need for change by including in the Telecommunications Act of 1996 provisions directing the Joint Board and the FCC to transform the pre-existing monopoly-oriented universal service subsidy policy into an explicit and specific support mechanism that would be technology-neutral and consistent with emerging competition.

The potential for inefficiency in consumption for a universal service program comes from the components included in the definition of the supported services. Once a consumer decides to purchase basic local service, there is an obligation to purchase the

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However, for greater clarity for the non-economist, we refer to these factors as inefficiency in funding and in consumption.

full range of components. A consumer may wish to trade away a component for its imputed purchase price.

Federal policy requires that the components be "essential to education, public health, or public safety" or "have, through the operation of market choices by customers, been subscribed to by a substantial majority of residential customers."[5] Consumers will generally not be willing to trade away components that they view as essential. Beyond the minimum set of supported components, service providers may choose to provide complementary components and services. Even if these complementary components and services are not supported, the supported components might not be efficiently supplied in their absence. Whether or not current and proposed components meet the policy mandate is the subject of the ongoing debate over the redefinition of universal service. We argue that it is best for this debate to be resolved by applying the efficiency criterion that springs from the policy's implicit economic foundation.

Assuming one can find an individual willing to trade away any particular basic local service component, requiring consumption of the full set of components will always be redistributive. Consumers willing to pay for a component will benefit at the expense of those wishing to trade it away. Given any level of support, the value of that support to those benefiting from the component must be greater than the implicit lost value to those who would be willing to trade the component away, if the component is to be included in the supported bundle of components.

Measuring the efficiency impact of redistribution short of the overall efficiency limit requires an aggregative measure that comparatively evaluates individual welfare. The efficiency of proposed components of universal service, via their ability to pass the trade-away test and avoid significant redistributive loses in the aggregate, ultimately requires empirical evaluation. Of course, pure empirical evaluations may be difficult or impossible. However, reasonable judgments can be based on indications of relative costs and benefits.

We can heuristically categorize the set of current components to be beneficial as either a connection standard or a service standard. The connection standards identify the functional performance of the technology that consumers must be able to connect *with* (without specifying a particular choice of access technology). The service standards identify what consumers must be able to connect *to*. Voice grade access to the public switched network, with the ability to place and receive calls; dual tone multi-frequency (DTMF) signaling or its functional equivalent; and single-party service are the group of connection standards. The combination of local usage, access to emergency services, access to operator services, access to interexchange service, access to directory assistance, and toll limitation services for qualifying low-income consumers form the group of service standards. The functional connection standards are standard across the telecommunications industry, and can be provided by both wireless and land-line technologies. If these standards are characteristics of cost minimizing production, the connection standard components are non-separable, without reasonable alternatives, and efficient. The components of a connection standard are likely to arise in the face of

[5] 47 USC 254(c)(1)(A) & (B)

significant economies of scale and scope in production. In an extreme case, a connection standard would exist with true joint production (i.e., without any additional cost to add the component).

Service standards may or may not have significant joint product economies or economies of scope (between service standard components and connection standard components, and/or between service standard components). The service standards are by nature more vulnerable to failing the trade-away test.

There is an additional, more difficult analysis that should also be performed. This analysis essentially poses the following question: does including a component in the supported services list cause some technologies or some firms to not deploy service in some areas? That is, adding a component to the required list of universal service components may come at such a high cost for some providers, or some technologies, that these providers or technologies can no longer afford to gain or retain certification, or may retain or obtain certification at a higher cost than is efficient. This by itself is not sufficient to determine that the component should not be included. However, there are two categories of potentially welfare-reducing results. First, this may cause fewer local providers in some areas. Second, the component may be added, but at too high a cost.

The Telecommunications Act of 1996 clearly states that promoting local competition is a goal in its own right. Providing a choice of providers should have some value to consumers. More importantly, when the availability of service from additional providers gives consumers access to a greater variety of service components and characteristics than they would have if they were limited to purchasing supported universal service from a single incumbent carrier (as appears to be the case of service also by a wireless provider), the value to consumers of access to additional competing carriers is likely to be large.

A provider may still seek to retain or obtain certification by adding a component to its current bundle of service components. However, for some providers, this is likely to lead to either higher prices for the service bundle or a reduction in other service components. If the added component has a lower value to consumers than the increase in price, and/or the reduction in other service components in the bundle, the result is inefficient and welfare reducing.

3. Proposed basic local service components

Besides evaluating the current set of components, we can use the efficiency criterion to evaluate proposed changes to the set of supported service components. One group of proposed changes centers on increasing the current connection standard bandwidth to extend support to improved internet or broadband access. The change would be consistent with the universal service principle that "Access to advanced telecommunications and information services should be provided in all regions of the Nation."[6] As desirable as this proposal might be to some consumers or in meeting a public policy goal, it doesn't appear to satisfy the efficiency criterion.

[6] 47 USC 254(b)(2).

The analysis of the Joint Board on Universal Service[7] is quite to the point in this case. They find that the additional cost of these services would be substantial. They also find that only 50.5% of households currently subscribe to internet access, and only 10.8 percent subscribe to high-speed or advanced services. [8] Expanded bandwidth may be too costly for some providers to achieve, leading to reduced numbers of providers in some areas, higher prices, or reductions in other service components of value. Applying the efficiency criterion, we conclude that the expanded bandwidth proposal would be highly redistributive, and currently is likely to reduce welfare in the aggregate. Certainly, as consumption patterns change over time, and/or as technology changes, bandwidth expansion may pass the efficiency criterion in the future.

Perhaps the most interesting proposal is the one for equal access. By adopting this proposal, all carriers offering supported services would be required to offer 1+ dialing to the consumer's choice of interexchange carrier. What makes equal access so interesting is its deceptive appearance. Certainly this so-called "service" satisfies many of the criterion put forward for supported services. It is used by a large majority of consumers, and most if not all wireline carriers have deployed the service. It may be a convenience to customers under some circumstances, though it doesn't appear to be a necessity.

However, consumers have never chosen to subscribe to this service. The equal access "service" hasn't resulted from consumer demand, but from regulation designed to promote a competitive interexchange market. In 1982 the Modified Final Judgment (MFJ, a modification to the 1956 AT&T consent decree) required the Regional Bell Operating Companies (RBOCs) to provide equal access. This was in response to two factors: 1) anticompetitive behavior by AT&T so extreme as to require the divestiture of the largest corporation in the world; and 2) a change from the line-based so-called ENFIA tariffs to usage-based switched access charges.[9] These processes were designed to create a level playing field in the then-infant interexchange carrier market.

A competitive interexchange market arguably adds to the general welfare, but this is an issue separate from the efficient support of basic communication access. 2003 seems to be a peculiar year to consider adding equal access "service" to the list of supported universal services. Interexchange competition is no longer in its infancy and the period for which equal access was critical for the industry is long since passed. [10] A wireless provider in essence can choose a long distance carrier (or carriers) on the basis of price

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[7] *Federal-State Joint Board on Universal Service*, Recommended Decision, 17 FCC Rcd 14095, 14099-14103, paras. 10-19(rel. July 10, 2002)).

[8] *Recommended Decision*, 17 FCC Rcd at 14100, para. 13.

[9] See, e.g., GERALD W. BROCK, TELECOMMUNICATIONS POLICY FOR THE INFORMATION AGE: FROM MONOPOLY TO COMPETITION, 1994; and INGO VOGELSANG AND BRIDGER MITCHELL, TELECOMMUNICATIONS COMPETITION: THE LAST 10 MILES, 1997. Also, in 1983 General Telephone (GTE) sought to acquire Sprint. In a quick settlement to a suit brought by the Department of Justice, GTE agreed, among other things, to provide equal access.

[10] Indeed, Congress in 1996 made the explicit policy choice not to impose equal access requirements on mobile wireless carriers, 47 USC 332(c)(8), while delegating to the FCC authority to determine whether or not to retain equal access requirements for wireline local exchange carriers. 47 USC 160, 251(b)(3), 251(g).

and service quality – the same dimensions as end-users themselves are likely to apply. Certainly, modifications to the definition of supported universal service must be based on statutory and regulatory requirements as well as sound economics; they should not be based on a distant byproduct of antitrust law.

The equal access "service" may add convenience to consumer choice under some circumstances, but it is difficult to apply the efficiency criterion to a service that doesn't result from consumer demand.[11] In the absence of mandatory/bundled equal access, consumers could have the advantage of aggregating traffic and increasing their bargaining power through the local carrier for lower interexchange rates. Equal access in this case reduces the bargaining power of consumers and may reduce their welfare.

As yet, we have not considered the two additional categories of potential inefficiency effects discussed in section 2 above. First, equal access could have the effect of preventing some wireless providers (and any other providers for which equal access is a costly activity) from offering supported universal service in rural areas. This would not only reduce the number of providers in some areas, it could drastically reduce the mix of service characteristics. Wireless services have characteristics that are clearly different from land-line services. These may include: 1) mobility; 2) ability to communicate over a broader range of times and locations; 3) wider local calling scopes; 4) the potential for lower overall rates; and 5) more responsive customer service from a second provider. We expect that each of these characteristics is complementary to the components of basic local service, enhancing their total value.

Second, the relatively high cost (assuming equal access is not an effective impossibility) of providing equal access via existing wireless facilities could lead to higher prices and service characteristic changes. The value of this these changes must be compared to the value consumer's place on equal access.

Of course, in the great majority of instances, if a customer places a high value on choosing a long distance carrier this is still possible through the choice of the incumbent land-line provider. However, this does not appear to be empirically important since a growing proportion of customers use wireless service in order to take advantage of the bundle of local and long distance minutes and the relatively low long distance price offered by the wireless provider.[12]

At this point, it is worth considering one aspect of inefficiency in production. Note that historically (before the Telecommunications Act of 1996), only incumbent land-line

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[11] We are not aware of any instance in which consumers are offered the opportunity to not receive equal access by paying a lower price. Indeed, this possibility was specifically avoided in the development of the PICC (before the adoption of the CALLs proposal) by applying the PICC even when customers did not designate a 1+ carrier.

[12] See, e.g., "Wireless Telephone Service Becomes Essential Communications Tool," Western Wats, February 20, 2002. In a survey conducted in counties with population density less than eight people per square mile, of those with wireless service, 48% of respondents reported that wireless service has replaced 90% or more of their land-line long distance. *See also Facilitating the Provision of Spectrum-Based Services to Rural Areas and Promoting Opportunities for Rural Telephone Companies to Provide Spectrum-Based Services*, WT Docket No. 02-381, Comments of Western Wireless Corporation (filed Feb. 3, 2003).

local exchange carriers were allowed to receive universal service funding. In rural areas, it appears that universal service funding and/or other forms of cross-subsidies represented a significant proportion of their overall revenues. This created distorted incentives in production favoring land-line technologies and creating a bias against wireless technologies.[13] As a general matter, wireless cost structures tend to be less sensitive to distance than land-line costs. Therefore, the cost minimizing technology choice in some longer distance (land-line long-loop areas) might have been wireless, rather than land-line technology. Therefore, we expect that without this historical distortion in incentives and inefficiency in production, many low density rural areas would have been initially served by wireless technology. The Telecommunications Act of 1996 and the FCC's implementation of the Act is beginning to eliminate this source of technology bias and production inefficiency by allowing wireless providers to have access to universal service funding.

The relevant efficiency comparison is of course for the geographic areas, providers, and technologies that would be affected by a change in the definition of supported universal services. The relevant comparison therefore appears to largely be for rural areas that are served (or that would be served) by wireless providers. The efficiency criterion therefore requires a comparison of the values to consumers of equal access against the benefits provided by the availability of supported universal service from wireless carriers (without equal access provided by wireless carrier). All indications suggest that value of wireless-based universal service in rural areas is greater than the value of equal access for all providers in an area.

4. Conclusion

There is no direct statement of the efficiency criterion in the law or regulation with respect to universal service. However, the statutory language requiring consideration of "the public interest, convenience, and necessity"[14] supports application of efficiency concepts as an economic measure of general welfare that must form the foundation upon which regulation must be based. With this foundation, we find that neither enhanced access standards nor equal access should currently be added to the definition of universal service.

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[13] It appears that U.S. universal service policy was not the only policy contributing to production inefficiency bias against wireless technologies. First, unlike land-line local exchange carriers, wireless companies obtain virtually no switched access revenues from long distance providers. Second, in the U.S. land-line and wireless terminating interconnection rates are generally equal. However, in virtually all of the rest of the world, wireless interconnection rates are higher, and often significantly higher, than land-line rates (since wireless costs of terminating calls are generally calculated to be higher than land-line costs). The effect of these policies in total was inefficiency in production; a distortion in incentives creating a bias for land-line technologies and a bias against wireless technologies.

[14] 47 USC 254(c)(1)(D).

Qualifications

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